

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/765,768	01/18/2001	Kevin G. Ewsuk	SD6641/S95450	9750

7590 07/29/2004

SANDIA NATIONAL LABORATORIES  
Patent & Licensing Center  
MS-0161  
P. O. Box 5800  
Albuquerque, NM 87185-0161

EXAMINER

MEHTA, ARUNKUMAR P

ART UNIT	PAPER NUMBER
----------	--------------

2128

DATE MAILED: 07/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/765,768

Applicant(s)

EWSUK ET AL.

Examiner

Arunkumar P Mehta

Art Unit

2128

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 18 January 2001.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. This application has been examined.
2. Claims 1-18 have been examined.

#### ***Specification***

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required.
4. The pharmaceutical and the plastic powders of claim 4 are not recited in the specification.
5. The mechanical pressing processes of claim 9 are not recited in the specification.

#### ***Claim Objections***

6. Claims 3 and 17 are objected to because of the following informalities: Correct "parallepipeds" to read as "parallelepipeds". Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:  

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
8. Claims 5, 11, and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
9. Claim 5 is vague and indefinite because the word "approximately" in line 3 is not specific and clear about the time.

9. Claim 5 is vague and indefinite because the word "approximately" in line 3 is not specific and clear about the time.
10. Claim 11 recites the limitation "the pressing process" in line 1. There is insufficient antecedent basis for this limitation in the claim.
11. Claim 18 is vague and indefinite because the word "approximately" in line 1 is not specific and clear about the time.

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1-7 and 9-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over K. E. Carr et al ("PCS ELITE – A complete Die Compaction Software Package", 1999), herein referred to as Carr and in view of Applicant's Own Admission (specification page 4, lines 3-4, page 5, line 17).

14. As per claim 1 Carr discloses generating a primary geometry of a component to be formed by powder pressing wherein the primary geometry is developed using a combination of axisymmetric geometric shapes and transition radii to simulate said primary geometry, said axisymmetric geometric shapes having variable dimensions (Abstract; page 10-112, 6<sup>th</sup> paragraph; page 10-114, 1<sup>st</sup> paragraph and figure 4; page 10-115, 1<sup>st</sup> and 2<sup>nd</sup> paragraphs; applicant's own admission in the specification teaches the transition radii; page 10-118, figure 8; page 10-119, 1<sup>st</sup> paragraph); developing a

finite element mesh (page 10-115, 4<sup>th</sup> paragraph); assigning material properties (page 10-115, 4<sup>th</sup> paragraph); defining pressing boundary conditions (page 10-115, 4<sup>th</sup> paragraph); defining powder and powder material properties to be pressed (page 10-116, 1<sup>st</sup> and 3<sup>rd</sup> paragraphs; page 10-117, 1<sup>st</sup> paragraph); calculating deformation characteristics of said powder and primary geometry using a deformation, nonlinear, quasi-static finite element code (page 10-111, 2<sup>nd</sup> paragraph; all of page 10-120 and 121; applicant's own admission in the specification teaches deformation, nonlinear, quasi-static finite element code); evaluating said deformation characteristics to determine the acceptability of said primary geometry (all of page 10-120 and 121).

15. As per claim 2, Carr discloses modifying said primary geometry, said material properties of said component and said pressing boundary conditions to form a component geometry (page 10-115 3<sup>rd</sup> paragraph; page 10-116 1<sup>st</sup> and 3<sup>rd</sup> paragraphs; page 10-117, 1<sup>st</sup> paragraph; page 10-119, 1<sup>st</sup> paragraph and figure 9).

16. As per claim 3, Carr discloses cylinder an axisymmetric geometric shape (page 10-112, 6<sup>th</sup> paragraph). Carr fails to disclose cones, toroids, spheres, parallelepipeds, ellipsoids, and polyhedrons. It would have been obvious to one of ordinary skill in the art at the time the invention was made to develop different axisymmetric geometric shapes for simulation.

17. As per claim 4, Carr discloses a metal powder (page 10-112, 6<sup>th</sup> paragraph; page 10-117, figure 7). Carr fails to disclose a ceramic powder, a pharmaceutical powder, a plastic powder and mixtures thereof. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use different powders for simulation.

18. As per claim 5, Carr discloses development of finite element mesh and calculation (page 10-117, 2<sup>nd</sup> and 3<sup>rd</sup> paragraphs). Carr fails to disclose that the calculations are performed in less than 60 minutes. It would have been obvious to one of ordinary skill in the art at the time of invention was made to perform calculations in less time for better and efficient simulation.

19. As per claim 6, Carr discloses development of finite element mesh and said calculation of the deformation characteristics are performed on a personal computer (page 10-117; 1<sup>st</sup> and 2<sup>nd</sup> paragraphs; page 10-118, figure 8; page 10-119, figure 9; all of page 10-120; page 10-121, figure 11).

20. As per claim 7, Carr discloses finite element mesh represents a two dimensional primary geometry (page 10-115, 3<sup>rd</sup> paragraph; page 10-118, figure 8; page 119, figure 9).

21. As per claim 9, Carr discloses primary geometry is the design of a component for use in mechanical pressing applications (page 10-112, 6<sup>th</sup> paragraph; page 10-113, figure 2).

22. As per claim 10, Carr discloses the primary geometry is the design forming a die (page 10-111, abstract; page 10-111, 5<sup>th</sup> paragraph; page 10-112, 6<sup>th</sup> paragraph).

23. As per claim 11, Carr discloses the pressing process is designed to produce the primary geometry (page 10-112, 6<sup>th</sup> paragraph; page 10-113, figure 2).

24. As per claim 12, Carr discloses the primary geometry is generated with the aid of a graphical user interface on a computer (page 10-111, abstract; page 10-114, 1<sup>st</sup> paragraph and figure 4; page 10-115, 1<sup>st</sup> and 2<sup>nd</sup> paragraphs).

25. As per claim 13, Carr discloses step of generating the primary geometry uses said axisymmetric geometric shapes selected from a menu of axisymmetric shapes interactively selected with the aid of a graphical user interface on a computer (page 10-114, 1<sup>st</sup> paragraph and figure 4; page 10-115, 1<sup>st</sup> and 2<sup>nd</sup> paragraphs).

26. As per claim 14, Carr discloses step of assigning the material properties to said axisymmetric geometric shapes is performed with the aid of a graphical user interface on a computer (page 10-115, 4<sup>th</sup> paragraph; page 116 1<sup>st</sup> paragraph; page 10-117, figure 7)

27. As per claim 15, Carr discloses primary geometry is generated with the aid of a graphical user interface on a computer using physical dimensions from a finished part (page 10-112, 6<sup>th</sup> paragraph; page 10-113, figure 1; page 10-114, 1<sup>st</sup> paragraph, figure 4).

28. As per claim 16, the primary geometry is generated with the aid of a graphical user interface on a computer whereby the geometric shapes used to construct the primary geometry are selected from a display menu on a computer screen (page 10-115, 1<sup>st</sup> paragraph, figure 4; page 10-115, 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> paragraphs, figure 5).

29. As per claim 17, Carr discloses generating a die geometry of a component to be formed by powder pressing wherein the die geometry is developed using a combination of axisymmetric shapes, transition radii, and transition spaces to simulate said primary geometry, said axisymmetric geometric shapes having variable dimensions, said axisymmetric shapes selected from cylinders, cones, toroids, spheres, parallelepipeds, ellipsoids, and polyhedrons; (page 10-111, abstract; page 10-112, 6<sup>th</sup> paragraph; page



Art Unit: 2128

10-114, 1<sup>st</sup> paragraph and figure 4; page 10-115, 1<sup>st</sup> and 2<sup>nd</sup> paragraphs; applicant's own admission in the specification teaches the transition radii, transition spaces are inherent in different geometric shapes; page 10-119, 1<sup>st</sup> paragraph), Carr discloses cylinder (page 10-112, 6<sup>th</sup> paragraph). Carr fails to disclose the geometric shapes cones, toroids, spheres, parallelepipeds, ellipsoids, and polyhedrons. It would have been obvious to one of ordinary skill in the art at the time the invention was made to develop different axisymmetric geometric shapes for simulation; developing a finite element mesh representing said die geometry (page 10-115, 4<sup>th</sup> paragraph); assigning material properties to said axisymmetric geometric shapes representing said component (page 10-115, 4<sup>th</sup> paragraph); defining pressing boundary conditions (page 10-115, 4<sup>th</sup> paragraph); defining a powder and powder material properties to be pressed in said primary geometry, said powder selected from a ceramic powder, a metal powder, a pharmaceutical powder, a plastic powder and mixtures thereof. Carr discloses a metal powder (page 10-112, 6<sup>th</sup> paragraph; page 10-117, figure 7). Carr fails to disclose a ceramic powder, a pharmaceutical powder, a plastic powder and mixtures thereof. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use different powders for simulation; calculating deformation characteristics of said powder and die geometry using a deformation, nonlinear, quasi-static finite element code (page 10-111, 2<sup>nd</sup> paragraph; all of page 10-120 and 121; applicant's own admission in the specification teaches deformation, nonlinear, quasi-static finite element code); evaluating said deformation characteristics to determine the acceptability of said die geometry (all of page 10-120 and 121).

30. As per claim 18, Carr discloses minimizing the computational time (page 10-117, 3<sup>rd</sup> paragraph). Carr fails to disclose that calculations are performed in less than 60 minutes. It would have been obvious to one of ordinary skill in the art at the time of invention was made to perform calculations in less time for better and efficient simulation.

31. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over K. E. Carr et al ("PCS ELITE – A complete Die Compaction Software Package", 1999), herein referred to as Carr and in view of Applicant's Own Admission (specification page 4, lines 3-4, page 5, line 17) and in further view of H. Zipse ("Finite Element Simulation of the Die Pressing and Sintering of a Ceramic Component", 1997), herein referred to as Zipse.

32. As per claim 8, Carr fails to disclose said finite element mesh represents a three-dimensional primary geometry. H. Zipse teaches the three-dimensional geometry (page 1709, figure 4; page 1710, figure 5). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the teachings of Carr with Zipse to learn about the density distribution in the final product.

### ***Conclusion***

33. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Weiss et al (US 4,912,664), Method and apparatus for generating a mesh for finite element analysis.

Pento (US 5,517,871), Procedure for simulating tablet compression.

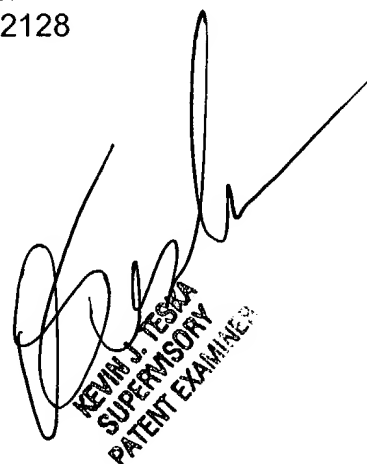
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arunkumar P Mehta whose telephone number is 703-605-1227. The examiner can normally be reached on 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska can be reached on 703-305-9704. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Arunkumar P Mehta  
Examiner  
Art Unit 2128

APM



KEVIN J. TESKA  
SUPERVISORY  
PATENT EXAMINER